

SOME PSYCHOLOGICAL DETERMINANTS OF STRESS BEHAVIOR

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In this presentation I would like to consider some general ideas about the nature of stress and its relation to psychological functioning, particularly with regard to the alterations of cognition found in studies of laboratory, clinical and life stress. Important in this domain is an understanding of the conditions under which stress organizes and under which it disorganizes behavior. Lastly, I should like to raise some questions about the meaning of 'stress resistance', frustration tolerance and cognate concepts which describe individual differences in persons' capacities to function, at all or effectively, under stress.

The use of the term "stress" in behavioral and biological sciences probably derives from the physical sciences, where usage has specified that stress is a force which is exerted on some system in such fashion as to deform, alter or damage the structure of that system, while the resulting deformation is described as strain. The stress-strain concepts are thus related in stimulus-response fashion. In our fields, there is no ready agreement on formal definition, but a common sense emerges as to the phenomena under consideration. There are statements which define stress in terms of stimulus properties; others in terms of particular responses; and other definitions in interactional terms. Perhaps the simplest way out of a definitional conflict is to assert that stress -- as noun -- describes an organismic state. Those events which provoke it are stress situations (or stimuli); the resulting behavioral alterations which occur are stress

reactions. Moving the term stress from noun to adjective is consonant with the usage of Janis (1958) and Selye (1950, 1956).

In the stress state there is sufficiently potent danger (actual or anticipated) to the organism's well-being as to require extraordinary measures for the maintenance of organized functioning or, these failing, which may lead to behavioral disorganization, anxiety or other emotional tension. Obviously, there are many threats to well-being, differing in type, intensity, extensity locus and duration. Some have greater representation in consciousness, and consequently greater effects on behavior. Vital danger to life itself can exist without conscious alarm, although physiological stress reactions may be evoked. Such, it is often noted, is the case in carbon monoxide poisoning. But suffocation through other causes leads immediately to anxiety, struggle and escape. Possibly conscious alarm reactions arose in evolution to signal on-coming danger in those cases where self-initiated actions could avoid its noxious effects.

It was to the great credit of Freud, in his later anxiety theory (Freud, 1936), to recognize the dual function of anxiety in regulatory and pathological behavior. Obviously a symptom of disordered psychological functioning, anxiety serves as the signal of danger in the psychological realm leading to anticipatory and defensive actions designed to restore adaptive functioning and to obvert further, more intense anxiety. In its signal function, anxiety may lead to more directed and organized problem-solving behaviors as well as to ego-defensive maneuvers. This failing, either because the stress is too intense or long-standing, or because the coping mechanisms are inadequate to their onslaught, and greater anxiety appears as symptom of a disintegrative state in which the capacity for

integrative actions are further reduced. In the psychoanalytic thesis (Fenichel, 1945), anxiety in its signal function is differentiated out of the original primitive emotional state as part of the general story of ego development. Obviously, to feel oneself threatened, there must be a sense of self and sufficiently developed cognitive mechanisms for differentiating not only self and not-self, but the objects of the environment as safe and unsafe. Memory of past dangers and anticipation of future are involved. As anxiety intensifies, there tends to be regression of these ego mechanisms to more primitive forms. The continuity from originally diffuse emotional state to adaptive use of the painful affect, to pathological breakdown and resulting traumatic anxiety state is well described by Kurt Goldstein (e.g., Goldstein, 1951). In his view, fear (i.e., painful affect directed toward an object and capable of instigating adaptive behavior) is differentiated out of a more primitive emotional matrix. Ultimately, the object of fear is the catastrophic state in which capacity for organized behavior disappears and all that is left, so to speak, is the enveloping anxiety. There are of course many important differences in these theories; in their views of the locus and historical development of affects, the role of psychodynamic and unconscious factors, and the like. But I would like to note the common elements: first, the developmental continuum from primitive to focussed to disintegrative anxiety (in Fenichel's terms "trauma" to "danger" to "panic"); and, second, the relation between such an emotional continuum and more general dimension of behavioral organization-disorganization.

The problem of anxiety is a central part of the problem of

stress. Indeed, stress might be defined as that stimulus condition likely to arouse anxiety, as Basowitz, Persky, Grinker and I (1955) suggested at one time, noting too that such stimuli might be more idiosyncratic or universalistic. We noted:

" . . . any stimulus may in principle arouse an anxiety response because of the particular meaning of threat it may have acquired for the particular individual. However, we distinguish a class of stimuli which are more likely to produce disturbance in most individuals. The term stress has been applied to this class of conditions. Thus we can conceive a continuum of stimuli differing in meaning to the organism and in their anxiety-producing consequences. At one end are such stimuli or cues, often highly symbolic which have meaning only to single or limited numbers of persons and which to the observer may appear as innocuous or trivial. At the other end are such stimuli, here called stress, which by their explicit threat to vital functioning and their intensity are likely to overload the capacity of most organisms' coping mechanisms."

" . . . Ultimately we can truly speak of a stress situation only when a given response occurs, but for schematic purposes as well as consistency with

common usage, we may use the term stress to designate certain kinds of stimulating conditions without regard for response. Such stimuli are called stress because of their assumed or potential effect, although we well know that in any given case the organisms' adaptive capacity, threshold, or previous learning may preclude any disturbance of behavior." (Basowitz, et al., 1955, p. 7).

Thus, in this statement, the stress state was described in stress-anxiety terms, where 'stress' describes the stimulus conditions and anxiety the defining response. Critics (e.g., Janis, 1958) pointed out two problems in this statement; first, that 'anxiety' defined too narrowly the potential range of disturbed affect, and that perhaps a term like "emotional tension" might be preferable; and that, second, there are logical and methodological problems inherent in an interactional definition which might be avoided by using stress as an adjective describing 'situations', on the one hand, and 'reactions' on the other. These are sensible criticisms and have been built into the definition earlier proposed. Still, have we avoided the interactional problem? Is it not built into the very definition of a "stimulus?"

If we turn now to consideration of the range of stress situations, even limiting ourselves to those used in human psychological research, it seems as if any stimulus can be a stressor if it is sufficiently intense, threatening and the proper organismic conditions exist. There have been a

number of good reviews of the conditions and effects of stress, and it is hardly necessary to repeat their listing here (see, e.g., Haggard, 1949; Hanfmann, 1950; Himmelweit, 1950; Lazarus, et al., 1952; Holtzman & Bitterman, 1952; Miller, et al., 1953; Basowitz, et al., 1955). Various classes (empirical groupings) of stress conditions have been suggested to summarize the variety of situations studied. Thus, Holtzman and Bitterman (1952) have catalogued the following groups of conditions which have been used in order to induce stress experimentally: 1) Disruption of physiological homeostasis. This would include the many studies of hypoxia, severe temperature and humidity, drugs, sleep deprivation, starvation and the like. 2) Unpleasant or physically painful stimuli. Here are included the administration of electric shocks, loud sounds, air blasts, thermal stimulation and similar noxious stimuli. 3) Distractions, razzing, and time pressures. The effectiveness of such agents depends in large measure on the degree to which the subject is ego-involved in the primary task. 4) Real, contrived or anticipated failure. Utilizing primarily intellectual tasks, this has been a favored method in psychological research. The same comment just made about distractions holds as well for these stress conditions. 5) Social conflict and related procedures. An example of these is the quasi-cooperative construction task used by the OSS assessment staff (OSS Assessment Staff, 1948). 6) Conflicting perceptual cues. This category includes such tasks as mirror-drawing and the Stroop color-word test. 7) Realistic situations threatening the individual's safety, such as simulated battle-fire, parachute jumping, submarine escape training. And not included in such a listing are the many life and laboratory conditions which might engender shame, guilt, anger, feelings of worthlessness,

rejection, or fear of life or loss of love, which are more closely related to clinically important stress. There is not much to be gained in cataloging all the possible forms and varieties of stress situations into loosely assembled empirical groups. It begins to be an intellectual exercise of the same sort as the older game of classifying emotions -- which once led the exasperated, but always expressive, William James to say, ". . . I should as lief read verbal descriptions of the shapes of the rocks on a New Hampshire farm as toil through them again. They give one nowhere a central point of view, or a deductive or generative principle. They distinguish and refine and specify in infinitum without ever getting on to another logical level" (James, 1890, p. 448).

Still, there might be some value in reconsidering the types of stress situations which have or might be studied, to see whether grouping in some more abstract categories might not reveal something more about the nature of the stress process.

1. Uncertainty. The ambiguous and vague situation, particularly if action is required and/or the organism is already highly motivated or anxious, is a powerful source of stress. Entrance into a novel situation, whether or not danger actually exists, has been described as an ubiquitous agent in the activation of the adrenocortical system (e.g., see review by Mason, 1959). The importance of novelty as a generic stress suggests the concepts which have been put forth by workers within the Pavlovian tradition. Thus, Liddell (1950) suggests that a prototype of anxiety might be the animal's vigilance response, akin to Pavlov's "What-is-it?" reflex, to a new and strange stimulus. Perhaps the extreme of uncertainty consists of

the complete absence of information which exists under conditions of sensory deprivation. Inspired by Hebb's thinking (Hebb, 1955) and the McGill studies (Bexton, et al., 1954), a burgeoning literature has grown demonstrating that sharp reduction of sensory input can lead to gross emotional and behavioral disorganization (for reviews, see: Solomon, et al., 1961; Fiske & Maddi, 1961; and Miller, 1962). The evidence of disturbance, even when in womb-like comfort, points up the important fact that a level of environmental stimulation is necessary for the maintenance of optimal comfort and function, and probably for its development in the first place.

2. Information overload. I believe I first heard this term used by James Miller to describe the reverse situation; the case where the organism is flooded with competing and demanding stimuli. However large, man's capacity as an information processing system is still finite. All conditions of distraction, excessive stimulation, time pressure and the like share in being informational overloads. In the psychoanalytic schema, the prototypic trauma is the overwhelming flood of excitation which the infant can neither avoid nor master; and the prototypic defense from which all later ego functions are seen as developing is the effort to block this flood (Reizschutz).

3. Danger. Danger, existing or anticipated, to the physical well-being or to the satisfaction of central needs, is an obvious source of stress. Properly included here are conditions of frustration. We should recall Maslow's (1943) caution that need deprivation, as such, does not constitute frustration, unless it connotes a threat to self-esteem as well.

4. Ego-control failure. An important function of the self and ego systems lies in the control of infantile and unsocialized impulses which are antipathetic to the self-concept and to internalized social values. The potential failure of controls is therefore stress, for example, in the common instances of temptation. We made use of this in one of our studies to induce some anxiety for experimental study (Korchin, et al., 1958). Subjects were shown a picture tachistoscopically and asked to describe it as carefully as possible. Following this, he was again shown the same picture (or so he thought) ostensibly to validate his original description. The picture, however, was changed, and in such a way as to impugn the subject's reality-testing by suggesting the intrusion of ordinarily-denied impulses. Thus, the first pair of pictures consisted of a man with a gun to his head, looking somewhat depressed; the "same" picture shown the second time had a pipe in place of the gun. In one study, it was found that this "ego-disintegrative threat" resulted in greater adrenocortical activation than did an induced failure in a quasi-intellectual test, of the sort more commonly used in psychological stress experiments, though both situations functioned as stress. (Korchin & Herz, 1960). The procedure developed by Asch for the study of independence and conformity is of a conceptually similar sort (Asch, 1952).

5. Ego-mastery failure. In discussing personality functioning, the term "control" somehow suggests holding the line, while "mastery" connotes moving forward. Hence, even though these are distinctly overlapping concepts I would like to distinguish the more positive from the more negative aspects of the problem, as Robert W. White does in his important concept of "competence" motivation (White, 1959, 1960). Being blocked from

mastering new goals, developing and exercising new talents, even though there is no danger to present control or need-satisfaction, can be an important source of stress. I am sure that Dr. Goldstein will develop this thesis at length, as he has in previous discussions of self-realization.

6. Self-esteem danger. Though related to the points just made, the centrality of the self and the importance of the sentiment of self-esteem in the understanding of stress behavior should be emphasized. Situations which depreciate or lower the subject's feeling of worth have been used in experimental studies; the term "ego-involved" to characterize some of these (as, e.g., in the work of Alper, 1946; 1948) refers not only to the fact that the subject is highly motivated, but that success or failure is vital to his self-esteem.

7. "Other"-esteem danger. A parallel source of stress is the danger of losing the esteem of others, losing face, status or love, being rejected or thought unworthy. This may, in large measure, be the outward face of self-esteem, as is suggested in the classic theory of George Herbert Mead (1934). But operationally these are of different order, and their role in stress situations clearly distinguishable.

Thus far, I have considered some definitional problems and reviewed some of the general qualities of stress situations which seem important to the understanding of their effects on psychological functioning. To continue this survey, I should like to comment now on those factors within the individual which affect resistance or receptivity to stress and finally to look at the effects of stress on psychological and physiological behaviors (stress reactions). As a map of the terrain, which might

have some heuristic value, Figure 1 indicates the areas which seem relevant in the study of stress.

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The chart consists of stimulus factors, on the left, and the organisms's reactions, on the right. Intervening between them are factors within the person. Overall, then, this is little more than Woodworth's old S-O-R formula which can be applied to any behavior sequence; in this case, stress.

I have already talked about the types of stress situations. I should like now to consider three factors which are important at the interface between the stimulus and the person: perceptive (evaluative) acts, motivation, and the social context within which stress occurs.

When said, it seems self-evident, but we sometimes overlook the fact the stress situation is part of the "behavioral environment" (Koffka, 1935) not the actual, and that its psychological import for the subject depends on a perceptual (evaluative) act. Recall Koffka's anecdote:

"On a winter evening amidst a driving snowstorm
a man on horseback arrived at an inn, happy to
have reached a shelter after hours of riding
over the wind-swept plain on which the blanket
of snow had covered all paths and landmarks.
The landlord who came to the door viewed the

stranger with surprise and asked him whence he came. The man pointed in the direction straight away from the inn, whereupon the landlord in a tone of awe and wonder, said: 'Do you know that you have ridden across the Lake of Constance?' At which the rider dropped stone dead at his feet" (Koffka, 1935, pp. 27-28).

Perhaps dropping "stone dead" is a bit excessive -- though studies of voodoo death give it credence -- but the psychological point is well made. Even such an apparently uniform noxious stimulus as electric shock has been shown by Tomkins (1943) to have quite different meanings, and hence effects, on different people. I should add one cautionary note to this discussion. The importance of the subject's interpretation of the stress situation should not be taken to suppose that everything that affects him is known to him, consciously experienced and interpreted. Stimuli may be subliminally experienced and mesh into unconscious psychological functions. Just as a barely detectible fragrance can evoke a déjà vu experience, another can cue an anxiety attack. Certainly, the mechanisms of "behavior without awareness" are still unknown (Eriksen, 1962), but the fact of its operation is demonstrable in many realms of personality functioning and psychopathology.

Related to the matter of perceptual interpretation is the fact that the stress situation occurs within a larger social context which contributes to the interpretative meaning of the stress. Particularly in experimental situations, of short duration and laboratory construction,

one can, but should not, lose sight of this fact. Perhaps a person a short distance away from the game of psychological experimentation can better see our faults, and Joan Criswell (1959) points out that we often deceive ourselves into thinking that the subject understands the situation as we intended him to.

A study was done at a large midwestern university to test the hypothesis that subjects in a hypnotic trance could be made to harm themselves. The subject was instructed to reach into a cage which visibly contained live rattlesnakes. Most subjects did so. Fortunately, they were protected by a sheet of "invisible" glass; the subject was not harmed, but the hypothesis was supported. But is this the only explanation? Does a sophomore at a state university, when he has voluntarily come to a professor's laboratory, really expect that he might be killed or even harmed? Is it not as likely that, in some sense, he "knew" that there was no real danger, and that he could carry through the role of "cooperative subject" without any genuine fear of harm befalling him?

Another example arises in one of our experiments (Grinker, et al., 1957). Anxious patients were subjected to stressful interviews. The interviews were designed to explore and confront the patient with potentially painful material of unresolved conflicts. At the same time, the interviewer adopted attitudes which might conflict with the particular patient's needs, and attempted also to distort the flow of communication as a further source of discomfort. For all this, the amount of anxiety aroused by this procedure was relatively small. Many subjects interpreted the meaning of this "stress situation" in terms of their

conception of the hospital and their role in it. The hospital was a benevolent place; the staff competent and sympathetic; it was a place for treatment and cure. Hence, this procedure might seem strange and perhaps somewhat annoying, but one could believe that it was some therapeutic device intended for his good. Indeed, an occasional subject commented later on the value of having an emotional problem brought forcibly to his attention, which his therapist had approached so gingerly.

Another factor of the same order is the motivational state of the subject and his more enduring personality traits. The more highly motivated the subject and the more relevant the stress situation to the achievement or frustration of that motive, the more likely is stress to ensue. Similarly, stress effects are greater the more central the frustrated motive or threatened value; that is, the more the subject's identity and self-esteem depend on it. Mahl (1949) studied gastric function in college students at the time of examinations and found some who showed little or none of the predicted changes. On closer investigation, these men turned out to be "gentlemen-C" students, for whom academic achievement was relatively unimportant. We found significant effects of induced failure in a test of "abstract intelligence" on later perceptual performance, when the subjects were young, male psychiatric residents (Korchin, et al., 1951). But in a later study, involving female social service students, the identical task had virtually no effect. In the self-concept (and, I believe, role-concept) of these girls, "abstract intelligence" did not figure prominently. If anyone was frustrated, it was the experimenter! It is easy but not necessary to multiply such examples. In Lazarus' view

of stress, the motivational construct is given a central position (e.g., Lazarus & Baker, 1956).

At the conceptual center of the chart (Figure 1) are those factors in the personality structure which describe vulnerability or susceptibility to stress, in general. Over and above issues concerned with the nature of the stress stimulus, or its relevance to the subject's values or motives, terms like ego strength, stress resistance, frustration tolerance and the like call attention to qualities in the structure of personality which determine the threshold for stress arousal or the capacity of the individual to maintain organized functioning under stress. Older, and perhaps unnecessarily rejected, terms like "strength of character" or "will power" carry the same connotation. Presumably ego strength arises out of the individual's history of earlier stress adaptations. Within the same conceptual realm are ~~those ego-defense mechanisms~~

which allow some, if limited, adaptive behavior and protect against the more destructive effects of anxiety. Although of central importance to the understanding of stress behavior, in the present context I want only to note the existence and importance of these factors in personality structure and functioning. We should note, however, that the role of defenses is often entered in the formulation of stress behavior as a sort of filter factor mediating between input and output -- if the stress is sufficiently strong and/or the defenses weak, then stress reactions will be enhanced. What is less commonly emphasized is the possibility that psychological and physiological changes may occur as a direct consequence of the defensive processes, although Hanfmann (1950) suggested this hypothesis

in an excellent review over a dozen years ago. Moreover, the specific nature of stress reactions may vary with the type of defense utilized, not only with its effectiveness. Mention is made of cognitive modes and somatic compliance on the chart to call attention to other personalistic dimensions which figure in determining the specificity of psychological and somatic response, respectively.

The right hand section of the chart sketches the main categories of stress reactions. Two orders of effects are distinguished -- the experiential and the behavioral -- to indicate the need for separate study of these realms of data.

There is a long-standing bias in psychology to regard as more basic and perhaps more "real" that which can be measured physiologically. By contrast, measures of psychological performance are somewhat more suspect and the subject's reported experience is virtually beyond the pale of scientific credibility. This attitude would be less dangerous if there were invariant relationships between stress stimuli and particular physiological responses, or between phenomenal experience and physiological measurements. For one thing, the work of Lacey and Malmö has shown individual response specificity in the study of autonomic functions. In response to stress, people respond in terms of individually-patterned profiles. Thus one person may show a quickening of the pulse, another more rapid respiration, and these patterns are remarkably constant over years and in response to quite diverse stimuli. But, equally important, is the fact that affective experience and somatic response may be dissociated as stress reactions. Anxiety may be experienced without parallel

physiological change, and vice versa. For these reasons, I would plea for considering both the physiological and the psychological, and for treating with equal respect the phenomenal and the behavioral in both realms. Each of these is a datum in its own right: "I feel apprehensive," "I am confused," "I have butterflies in my stomach," failure on a problem-solving test, and increase in muscle tonicity. Detailed studies of the relationships among these realms of functioning are needed, not reductionism.

The term "somatic experience" is suggested to describe the fact that, as part of the emotional state, we all experience characteristic bodily alterations. When anxious, for example, some of us feel our hearts beating faster, others constriction of the chest, others cold extremities. There is no simple relationship between the type or intensity of such reported symptoms and their measurable physiological counterparts, as Mandler and his associates have shown (Mandler & Kremen, 1958; Mandler, et al., 1958), although they and we (Korchin & Heath, 1960) have found that subjects who report more numerous or intense symptoms are, by psychological measures, more anxious. Equally interesting is the consistency in individual experience. Basowitz, et al., (1956) interviewed a group of young physicians and asked them to describe their characteristic symptoms in emotionally difficult situations. Later, the men were given a quite small dose of adrenalin. For some this roused anxiety and somatic symptoms, for others somatic experience without free anxiety, but in the great majority of cases the reported experiences were identical with those described as typical of past life stress. Thus, the

"cold-feet" man, got cold feet, and the "heart-palpitation" man developed heart palpitations. Though psychology textbooks dismiss the James-Lange theory, such findings should make us wonder whether there might not be some feedback loops worth reconsidering.

In a few minutes I would like to discuss some problems of stress and cognition in greater detail. However, I will bypass further consideration of the affective state in stress, except to note again the centrality of the problem of anxiety. Certainly, stress situations differ in the kinds of affect aroused, and these in turn may specify the types of psychological and physiological reactions observed. Thus, Ax, Funkenstein and their coworkers (Ax, 1953; Funkenstein, et al., 1957) have shown that anger-producing situations are more likely to lead to norepinephrine-like responses, whereas those conditions which lead to anxiety or self-directed anger produce epinephrine-like autonomic reactions. In our study of paratroopers in training (Basowitz, et al., 1955), we found evidence that when the focal threat involved fear of failure there was more effective functioning and less extreme physiological reactions than when the focal threat involved concern with bodily harm. We suggested that failure-anxiety (viewed as related to shame) is more likely to organize and facilitate behavior, while harm-anxiety (dynamically related to guilt) is more likely to lead to disorganization. Terms like "emotional arousal" mask the possibility of discovering more specific relationships between the type of emotion and other aspects of behavior under stress.

The schema thus far discussed is entirely contemporaneous; it

pictures the action of variables as of a conceptual moment in time. For this presentation, the historical aspect, describing emergence of these personality structures and modes of stress response in the development of the individual has been ignored. Questions as to what conditions lead to greater ego strength, to particular stress susceptibilities, or to one rather than another mode of stress reaction, have been intentionally put aside. But I have neglected also to note another time-related issue -- the temporal dimension involved in the ordering of response. The situation we have been discussing describes the acute stress condition, which is typical of much psychological and physiological experimental research. In life stress of a more chronic sort, both the stress situation and stress reactions occur over time, and as Janis (1954) and others have pointed out may involve distinct phases.

One aspect of the temporal ordering of stress reactions is worth special comment, since it suggests psychobiological mechanisms of considerable importance in stress adaptation. Wartime studies of men under combat stress showed incubation effects of such sort that maximal anxiety might not occur until after men have left the battle scene (Grinker & Spiegel, 1945). We have all had the more common experience of being involved in an actual or near-miss auto accident. We may have functioned appropriately through the crisis, only to find ourselves overwhelmed by anxiety, flooded by somatic symptoms, and unable to drive further -- minutes and miles later when in objective safety. This delay of maximal anxiety response would seem to have great adaptive value, since it allows appropriate function at the crucial time, .

even if incapacitating later. In our study of paratroopers, a similar phenomenon was described (Basowitz, et al., 1955). We followed groups of young, healthy men through three weeks of their program, making measures of anxiety, perceptual test performance, and various biochemical functions each day as they made their various tower and airplane jumps. Although these measures moved in more or less sensible ways in response to the events of training, an unexpected finding was a significant increase in stress indicators three days after graduation. It seemed to us that this might represent a release phenomenon from the control of feelings and associated stress behaviors which had been necessary for adaptive behavior during training. Support for this interpretation was also given by the finding that the group which had functioned best, and had the least evidences of disturbed affect or behavior, showed the greatest post-graduation rise.

In the preceding pages, I have tried to schematize and discuss, at least in broad outline, the overall field of stress and to distinguish some factors which seem important in the interplay of stress situations, qualities of the person and stress reactions. Because of special interest, I have saved for last consideration of the relation between stress and cognitive functioning.

From many theoretical quarters there has been convergence on a construct of activation or arousal as a general dimension which directs and energizes behavior from a state of unorganization, at the one end, through conditions for optimal functioning to states of disorganization,

at the other end. Workers concerned with neuropsychology, EEG correlates of behavior, autonomic processes, and the theory of emotion have contributed to this generalization about the curvilinear relation between activation and performance. Optimal functioning exists neither at the minimum nor maximum stimulus inputs, but at intermediate levels. In the context of present concern, it is hypothesized that increased stress leads to more organized behavior when occurring against a background of low order arousal and to disturbed behavior when imposed on a higher level.*

The dual role of anxiety, as organizing signal and disruptive symptom, has already been commented on. As stress mounts, from initially low levels, the organism experiences alertness, excitement and apprehension, all of which can actuate appropriately defensive actions. At still higher levels, with continued stress there is greater anxiety and eventually panic. The organism becomes less capable of functioning effectively, particularly if such function requires the handling of new, complex, abstract or otherwise demanding tasks. At extreme levels of stress, organized behavior breaks down and not even simple psychological performance is possible.

The life-space, or experiential field, of the subject changes in parallel fashion. At lower levels, attention becomes more focussed and the individual is more attentive to his surround. Irrelevant stimuli are ignored, and there is centration on possible sources of threat. The time perspective of the individual tends to contract toward the immediate present; the past is irrelevant and the future vague and uncertain. At the extreme, boundaries

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* For references and further discussions of these concepts; see, Korchin, 1962.

become diffused and there is a general state of confusion within which the individual is unable to distinguish the relevant and irrelevant or even the real and unreal. While at lower levels of threat there is heightened awareness of self, at more intense levels there is greater uncertainty as cognitive disorganization mounts.

Review of the formidable literature on psychological functioning under conditions of stress and anxiety suggests certain generalizations. Performance decrement is more likely to occur if the subject is operating at or close to his limit of performance, i.e., if the task requires all available skill, concentration or effort. Moreover, the more complex the task, the more it involves competing stimuli, the more stress-sensitive it is likely to be. The acquisition of new learning is more difficult than the practice of older. Operating against established habits is difficult. For example, inadequate performance on a mirror-tracing task has been described as pathognomic of anxiety by Wechsler and Hartogs (1945). Tasks requiring a narrow focussing of attention (e.g., digit-span) or wide ranging attention (as in incidental learning) suffer.

Recently, I have suggested that some unity might be given the diverse findings on the effects of stress on cognitive organization and psychological performance by viewing the problem in terms of the alteration of the attentional field (Korchin, 1962). Prior to the more extreme levels of breakdown, there is a narrowing of the attentional field -- Tolman (1948) once noted that cognitive maps are narrowed in states of intense emotion. This reduces the flexibility of performance, but whether it facilitates or disturbs performance depends on the nature of the task. For example, it is

predictable that where behavior involves "doing two things at once," where there are focal and peripheral functions being assessed simultaneously, there will be relatively more decrement measurable in the peripheral than focal tasks. Vigilance experiments involving a broad field and studies of incidental learning support such a view. Recently, Easterbrook (1959) has proposed a similar interpretation phrased in terms of a reduction in the "range of cues utilized" under emotional arousal.

Before concluding, I should like to add a final comment about stress resistance in general, mainly to raise an issue for discussion. By now, I am sure that I have conveyed the complexity of the problem of stress, as I see it. The nature of stress behavior depends on qualities of the threat, its locus, intensity and duration, how it is viewed by the person, his motives, values, defenses, the demands of the task confronting him, and still other factors. All this would suggest considerable specificity in predicting stress resistance or responsivity in a particular man. Yet common sense and clinical knowledge indicate pervasive and consistent differences among individuals in the load they can take. Freeman (1939) once suggested the term "psychiatric plimsoll mark" to characterize individual differences in stress tolerance, drawing for analogy on the mark made on the side of a ship to indicate the point to which it could safely be loaded and still withstand the rigors of storm and high sea. This is an expressive phrase, though our earlier analysis would suggest that each of us has many rather than one such mark. However, what is implied in the phrase, and many others like it, is that each man has his "breaking point;" some at a lower and some at a higher level of stress. Corollary to this are the

added implications that more stress resistance is better than less, and that having high stress tolerance is part of the general state of personality adequacy. Psychiatrically-ill is often made synonymous with stress-sensitive; mentally-healthy with stress-tolerant. Surely, these are acceptable generalizations and we use them commonly in lay and professional discussions but we should note some unwonted implications.

In opening another conference on stress, Sir Geoffrey Vickers (1960) quoted Field-Marshal Lord Wavell as saying that one should not be surprised at discovering stupidity in generals, for they are selected from the extremely small group of humans who are tough enough to be generals at all. Neither cleverness nor sensitivity are parts of their essential qualifications, but rather that they should be able to function, even if poorly, in situations in which cleverer and more sensitive men would have ceased functioning altogether. Stress resistance may be bought at the cost of other desirable qualities.

The intellectually-dull, the unmotivated, the uninvested to be able to stand frustration better than the more clever and committed man. Stress resistance may result from an insensitivity to the range of experience, which misses potential threat along with other aspects of the world. It is interesting that the word sensitivity carries both good and bad connotations. On the one hand it suggests finer discrimination and fuller understanding, and on the other hand greater readiness to feel personal hurt, which is perhaps a cost of being more discriminating. I would be hesitant to predict whether the more creative person should be more or less stress resistant.

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